

Smart Forms

An Informatics Architecture for
Documentation-based Clinical Decision
Support

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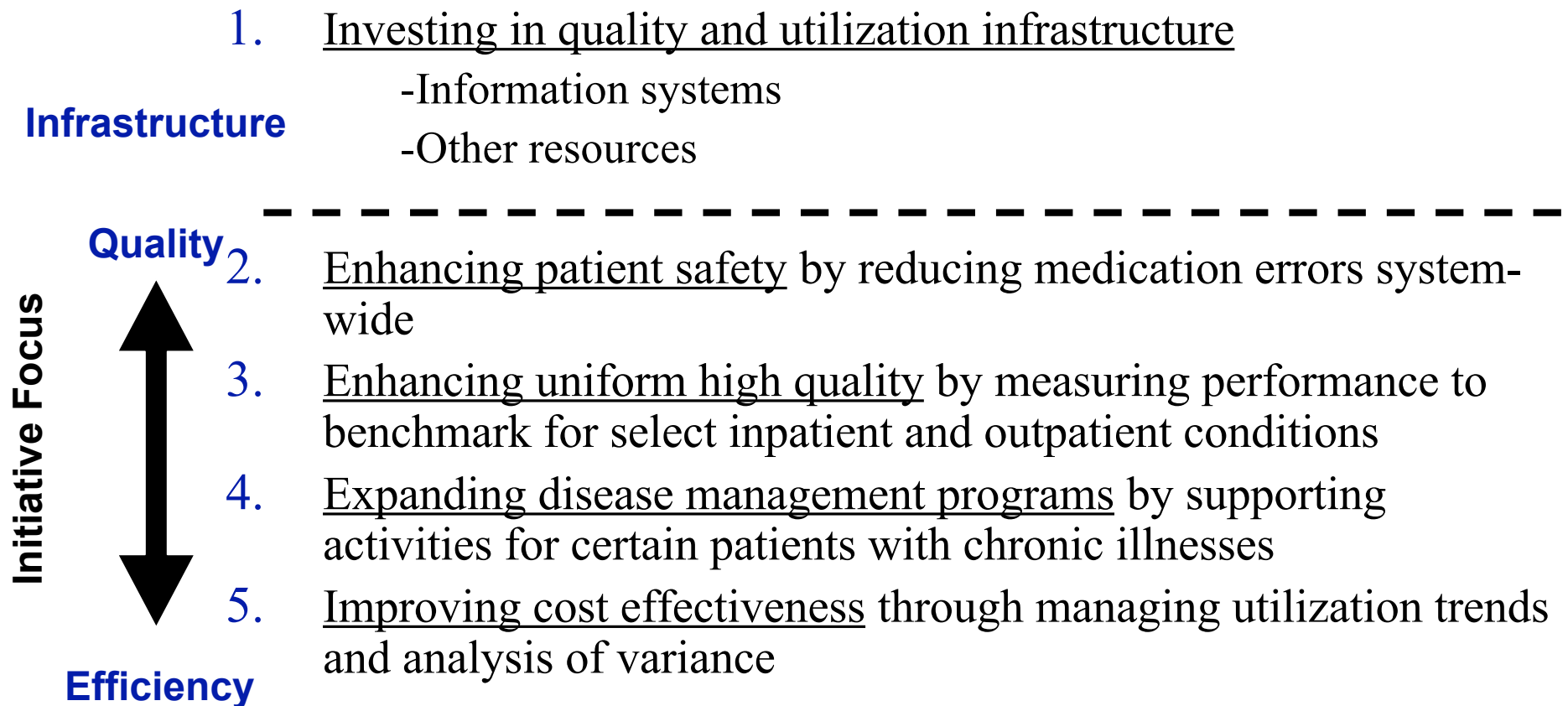
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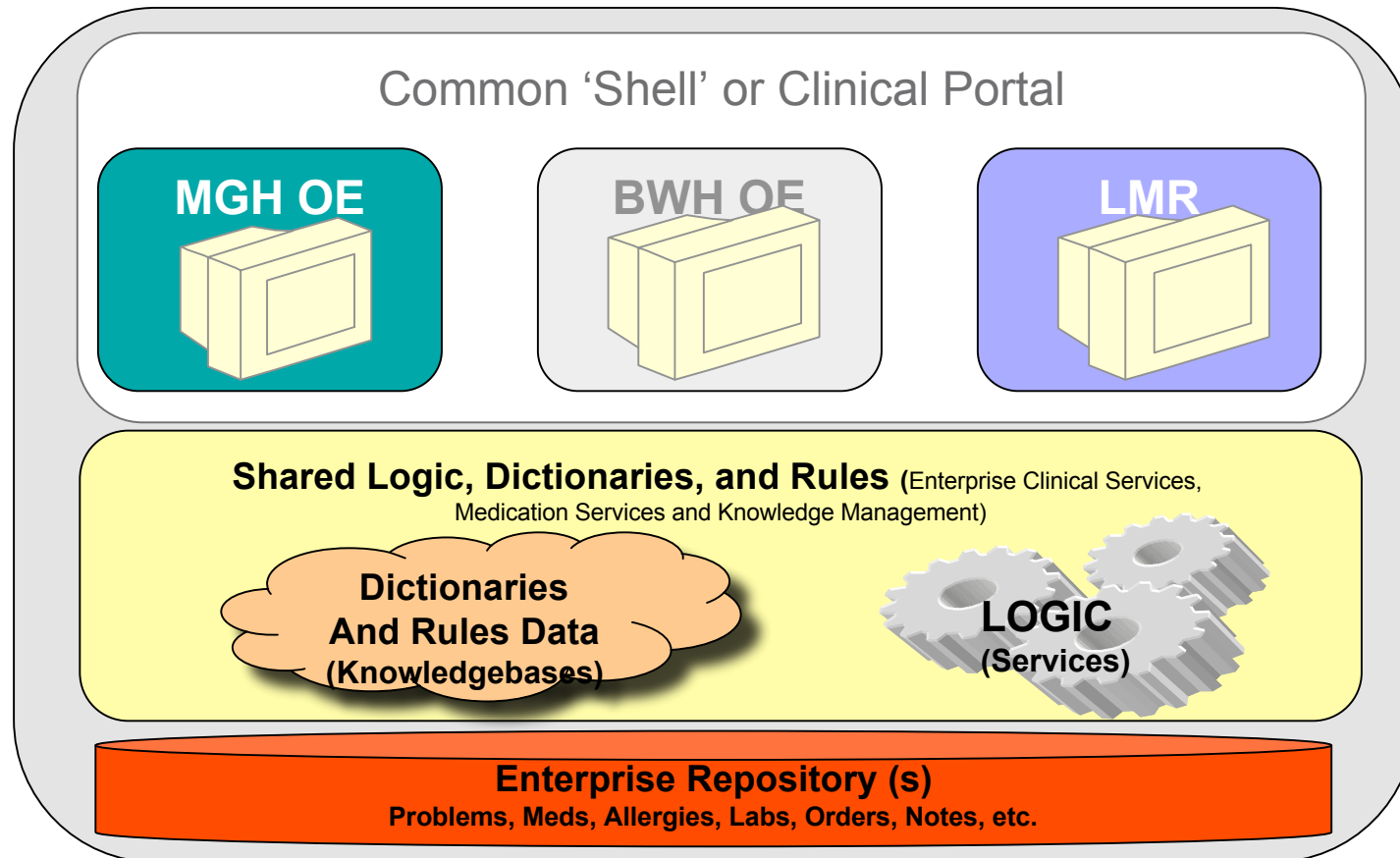


What Are the HPM Initiatives?

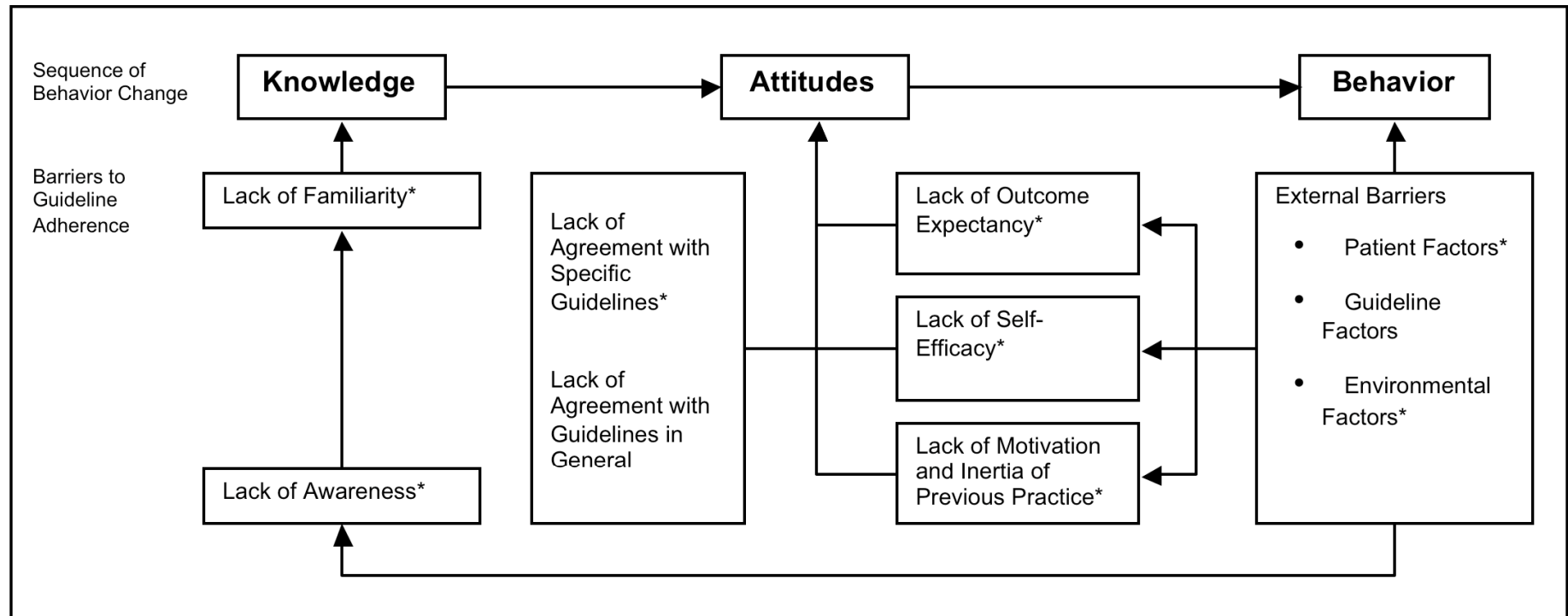


The Future: Shared Data, Knowledge Logic, Maintaining Custom Presentation Layer

Future clinical applications will take advantage of shared repositories of enterprise data, knowledge, and logic, in a *services-oriented architecture*



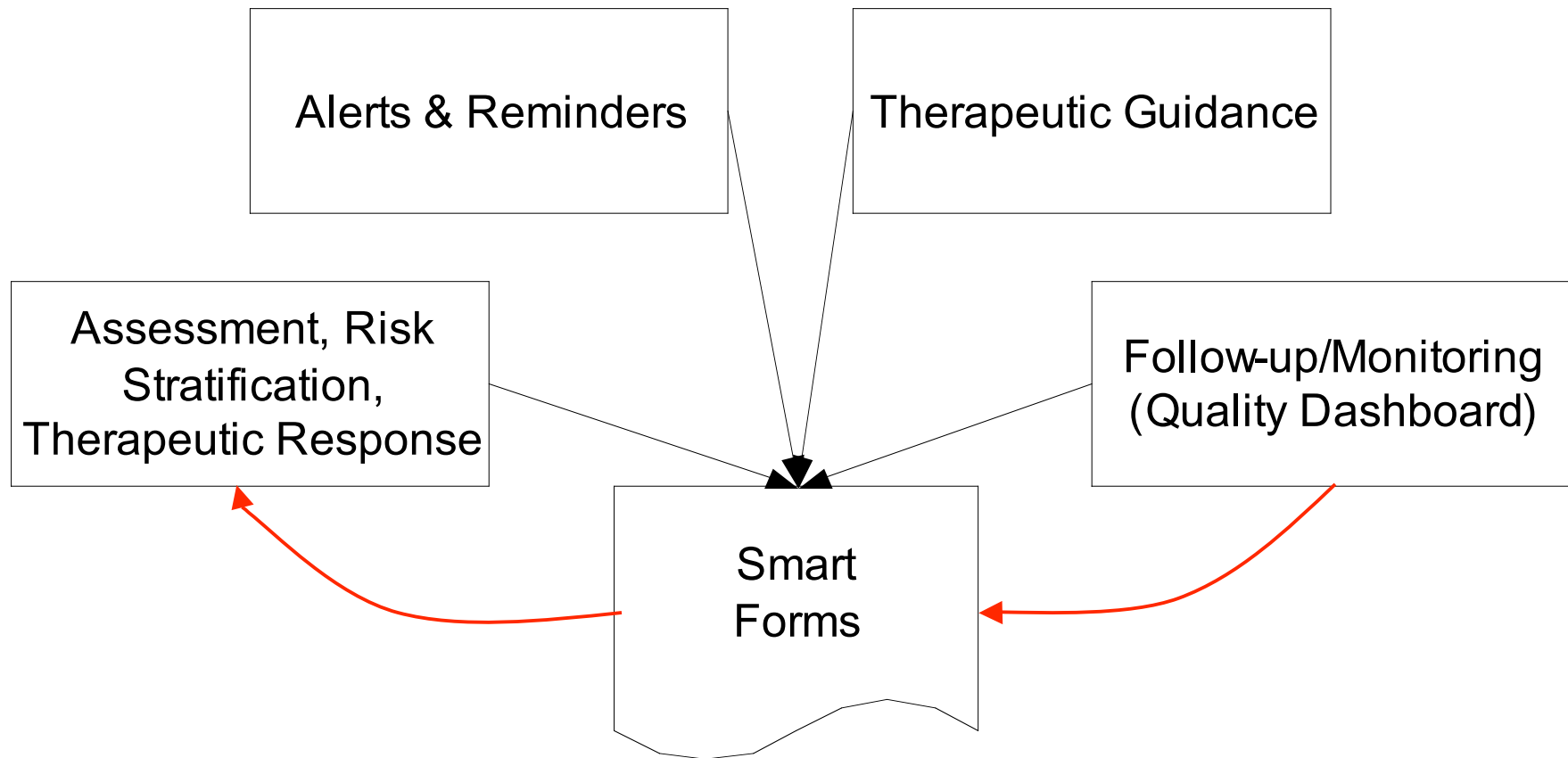
Barriers to Physician Adherence to Practice Guidelines in Relation to Behavior Change



**Barriers potentially addressed by implementation of Smart Forms.*

Cabana MD. JAMA. 1999;282:1458-1465.

CDS Integrated into the Clinical Workflow



What is a Smart Form?

- Clinical documentation-based
- Actively engage user during workflow
- Organize relevant data
- Request new data
- Integrate decision support, ordering, patient education, and documentation

CAD/DM Smart Form

Smart View:
Data Display

Smart
Documentation

Smart
Assessment,
Orders, and Plan

Assessment and
recommendations generated
from rules engine

- Lipids
- Anti-platelet therapy
- Blood pressure
- Glucose control
- Microalbuminuria
- Immunizations
- Smoking
- Weight
- Eye and foot examinations

Assessment

No recent LDL measurement

Patient is on anti-platelet therapy

Blood Pressure is above goal (avg. over last 2 visits 130/80, goal < 130/80)

Patient is due for Pneumovax (older than 65, no record of prior vaccination)

Patient is due for Influenza Vaccine (high risk medical condition)

Patient may be Current Smoker, not thinking of quitting. Last counseled on 10/10/06.

Patient is overweight or obese (BMI 27.1 on 10/31/06, goal < 25)

Save as Final & Exit

Exit

take 1) PO QD

CAD/DM Smart Form

Lmrsfest,Cadfive
 20567889 (BWH) 01/01/1931 (75 yrs.) M

Log RCT Select Desktop Pt Chart: Smart Form Oncology Custom Reports Admin Sign Results ? Resource

Vital Signs

	10/31/06	10/10/06	03/06/06
T (<98.6)		98.5F	
BP (<130/80)	150/75!	110/85!	110/75
HR (50-100)	70	85	
RR	14		
O2 Sat			
WV	200lb		165lb
H	72in		
BMI (<25)	27.1!		22.4

Rules

If patient has DM then goal BP < 130/80

If the average of the blood pressure at the last 2 visits (in the last year) is above goal then return..

Procedures

None listed

Save & Exit Save as Final & Exit Exit

Assessment

No recent LDL measurement

Patient is on anti-platelet therapy

Blood Pressure is above goal (avg. over last 2 visits 130/80, goal < 130/80)

Patient is due for Pneumovax (older than 65, no record of prior vaccination)

Patient is due for Influenza Vaccine (high risk medical condition)

Patient may be Current Smoker, not thinking of quitting. Last counsel date is 10/10/06.

Patient is overweight or obese (BMI 27.1 on 10/31/06, goal < 25)

- Lipid Management
- Antiplatelet Therapy
- Blood Pressure Management
- Immunizations
- Smoking
- Weight/BMI
- Follow-ups

CAD/DM Smart Form

Lmrsfest,Cadfive

20567889 (BWH) 01/01/1931 (75 yrs.) M

Log RCT Select Desktop Pt Chart: Smart Form Oncology Custom Reports

SmartView

Filter by

☒ CAD ☒ DM ☒ Smoking

Detected: CAD,DM,Smoking

Vital Signs

	10/31/06	10/10/06	03/06/06
T (<98.6)	98.6	98.5F	
BP (<130/80)	150/75	110/85	110/75
HR (50-100)	70	85	
RR	14		
O2 Sat			
Wt	200lb		165lb
H	72in		
BMI (<25)	27.1		22.4

Lab Tests Last Known

- K
- Creatinine
- BUN
- Glucose
- HbA1c (4.4-6.4)

Medication Orders

75 yo man with CAD, DM, and elevated CK. He is not h any of his medications. I last saw him 3 months ago.

Review of Systems ✓

ROS: No F, C, N, V, SOB, cough, CP, palpitations, abd bowel changes, vision changes, hearing changes, MS p headaches, tingling in limbs, increased sweating, depre

CAD-related

- Diabetes mellitus type 1
- Coronary artery disease

DM-related

- Diabetes mellitus type 1

Referrals

- Onychomycosis
- Elevated creatine phosphokinase

Procedures ✓

None listed

Save & Exit Save as Final & Exit

Blood Pressure Management

Blood Pressure is above goal (avg. over last 2 visits 130/80, goal < 130/80)

[Start an Other Anti-Hypertensives \(Help Me Choose\)](#)

[Adjust Oretic 25 MG \(25MG TABLET take 1\) PO QD](#)

[Adjust Lisinopril 20 MG \(20MG TABLET take 1\) PO QD](#)

[Adjust Acebutolol HCL 200 MG \(200MG CAPSULE take 1\) PO QD](#)

☐ Order Chem 7 now

☐ Order Chem 7 in

☐ Referral to Nutritionist

☐ Referral to Cardiac Rehab [\(Help Me Choose\)](#)

☐ Referral to Blood Pressure Specialist [\(Help Me Choose\)](#)

☐ [Print "Control High Blood Pressure"](#)

☐ [Print DASH diet instructions](#)

☐ [Print exercise "prescription"](#)

CAD Quality Dashboard











PARTNERS. Report Central | Provider: JUDGE, DAVID C. M.D. | Location: [REDACTED] | Feedback

Reports | **Quality Dashboards** | Help | Admin

ARI Dashboard | CAD Dashboard

Red, yellow, and green indicators show adherence with targets

Targets are 90th percentile for HEDIS or for Partners providers

Measure	My Value (N)	Clinic Average (N)	Target
  ACE Inhibitor/ARB Management: % of patients on ACE inhibitor/angiotensin-receptor blocker	52% (55)	59% (1093)	> 78%
  BMI Documentation: % of patients with BMI documented	22% (23)	45% (839)	> 76%
  Smoking Status Documentation: % of patients with smoking status documented	18% (19)	32% (597)	> 87%
  Anti-platelet Management: % of patients on anti-platelet	81% (85)	79% (1479)	> 94%
  Beta-blocker Management: % of patients on beta-blocker	69% (72)	75% (1392)	> 80%
  Beta-blocker Management: % of patients with beta-blocker	27% (28)	50% (929)	> 68%
  Zero Defect Care: % of patients with zero deficiencies	75% (79)	72% (1352)	> 62%
	0% (0)	1% (14)	> 47%

Total # of CAD Patients: 105

Zero defect care:

- Aspirin
- Beta-blockers
- Blood pressure
- Lipids

Quality Dashboards

↔ Smart Forms

Smart Forms and Quality Dashboards work together to improve quality

Same data feeds Quality Dashboards and Smart Forms

Smart Forms capture structured information that informs Quality Dashboards

Quality Dashboards allow clinicians to “drill-down” from a population view to individual patient Smart Forms to address quality deficiencies

The screenshot displays a medical software interface with a patient's Smart Form and a Quality Dashboard. The Smart Form is titled "Patient View" and shows a "Routine Visit" on "11/1/2006". The "Problems" section lists "CAD-related" (Diabetes mellitus type 1, Coronary artery disease) and "DM-related" (Diabetes mellitus type 1, Coronary artery disease). The "Meds" section lists "Anti-Hyperglycemic" (Acetylsalicylic ACID 325, MG (325MG TABLET take 1) PO QD), "ACE-I/ARB" (Lisinopril 20 MG (20MG TABLET take 1) PO QD), and "Beta-Blockers" (Acebutolol HCL 200 MG (200MG CAPSULE take 1) PO QD). The "Allergies" section is empty. The "Medications" section is also empty. The "Quality Dashboard" on the right shows "Assessment" and "Lipid Management" sections. The "Assessment" section lists "No recent LDL measurement", "Patient is on anti-platelet therapy", "Blood Pressure is above goal (avg. over last 2 visits 130/80, goal < 130/80)", "Patient is due for Pneumovax (older than 65, no record of prior vaccination)", "Patient is due for Influenza Vaccine (high risk medical condition)", "Patient may be Current Smoker, not thinking of quitting. Last counseled on 10/10/06.", and "Patient is overweight or obese (BMI 27.1 on 10/31/06, goal < 25)". The "Lipid Management" section lists "No recent LDL measurement", "Order Lipid Panel With Direct LDL now", "Print outside lab request for fasting lipid panel", "Order Lipid Panel", and "Print instructions for fasting lipid panel". The "Antiplatelet Therapy" section lists "Patient is on anti-platelet therapy". The "Blood Pressure Management" section lists "Blood Pressure is above goal (avg. over last 2 visits 130/80, goal < 130/80)", "Start an Other Anti-Hypertensives (Help Me Choose)", and "Adjust Oretic 25 MG (25MG TABLET take 1) PO QD".

CAD/DM Smart Form

Pilot Results

Deficiency Addressed When Present at Index Visit	Pre-intervention Visit	Smart Form Visit	P value
Up to date blood pressure result (within 12 months) documented in vital signs	43/133 (32.3%)	14/15 (93.3%)	< 0.001
Smoking status documented in health maintenance or problem list	21/339 (6.2%)	11/46 (23.9%)	< 0.001
Up to date A1c result (within 12 months)	24/226 (10.6%)	5/28 (17.9%)	0.34
Antiplatelet prescribed or contraindication documented	10/309 (3.2%)	13/42 (31.0%)	< 0.001
Beta-blocker prescribed or contraindication documented	1/24 (4.2%)	2/3 (66.7%)	0.03
Up to date blood pressure result (within 12 months) documented in vital signs	43/133 (32.3%)	14/15 (93.3%)	< 0.001
Change in diabetic therapy if A1c > 7.0	44/413 (10.7%)	14/83 (16.9%)	0.11
% deficiencies addressed	7.9%	13.6%	0.0004

60% of users felt that the Smart Form helped them comply better with guidelines and helped them improve the quality of patient care.

Research Summary to Date

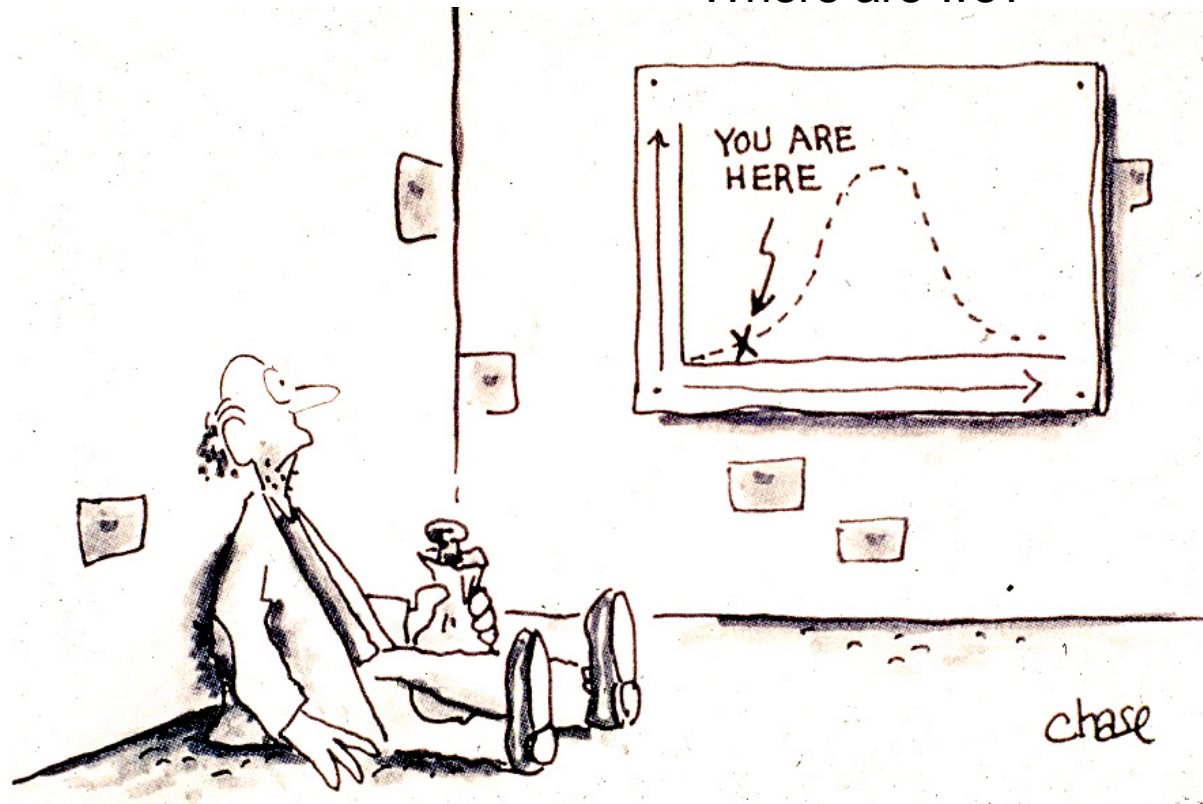
- CAD/Diabetes SF
 - Improves documentation of coded data when used
 - Blood pressure, smoking status
 - Sometimes changes clinical management
 - Is believed to improve care by PCPs
 - Major issue is integration into workflow
- ARI SF
 - Decreased antibiotic use by 5% in RCT
 - Has now been used on over 6000 patients
 - 28 “power users”

Conclusions based upon Research Findings

- When used the SF improves the capture of structured data
- Positive changes in clinician behavior
- May impact on clinical inertia
- Big issue currently is fitting into physicians' varied workflow requirements
- By incorporating decision support into clinical workflow, SF has the potential to improve care for patients with chronic conditions

Q&A

Where are we?



Thank you!
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